

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
23 October 2003 (23.10.2003)

PCT

(10) International Publication Number  
**WO 03/087620 A2**

(51) International Patent Classification<sup>7</sup>: **F16G**

[JP/US]; 2905 Billy Jack Drive, Apartment 1, Conway, AR 72034 (US).

(21) International Application Number: PCT/US03/10824

(74) Agents: COX, Ray, F. et al.; Wright, Lindsey & Jennings LLP, 200 West Capitol, Suite 2300, Little Rock, AR 72201-3699 (US).

(22) International Filing Date: 7 April 2003 (07.04.2003)

(25) Filing Language: English

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(30) Priority Data:  
10/118,264 8 April 2002 (08.04.2002) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:

US 10/118,264 (CIP)  
Filed on 8 April 2002 (08.04.2002)

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*):  
**TOKUSEN U.S.A., INC.** [US/US]; 1500 Amity Road, Conway, AR 72032 (US).

(72) Inventors; and

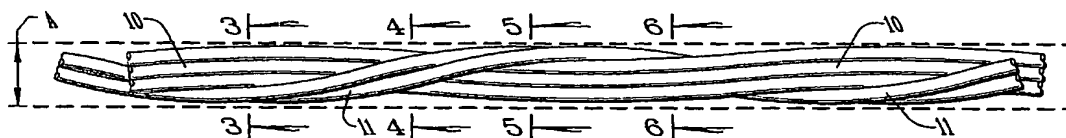
(75) Inventors/Applicants (*for US only*): **KOBAYASHI, Takanori** [JP/JP]; 748-1 Sumiyoshi-Cho, Ono City, Hyogo Prefecture, Japan 675-1361 (JP). **SMITH, William, E.** [US/US]; One Cottontail Drive, Conway, AR 72032 (US). **SMITH, Charles, E., Jr.** [US/US]; 3275 Chrysler Cove, Conway, AR 72034 (US). **MORIOKA, Noritaka**

#### Published:

— without international search report and to be republished upon receipt of that report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: FLATTENED HELICAL TIRE CORD



(57) Abstract: A tire cord having core filaments (10) performed into a helical configuration while maintaining the core filaments (10) in a parallel, side-by-side relationship. The core filaments (10) are not twisted or stranded together. High tensile strength sheath filaments (11) are also performed into a flattened helical configuration so that the sheath filaments (11) can be wrapped around the side-by-side core filaments such that the sheath filaments (11) do not put such tension on the core filaments (10) as to cause the core filaments (10) to bunch. The core filaments (10) are maintained in a flat side-by-side configuration so that no voids are formed and rubber can penetrate into the tire cord. The core filaments (10) may number from three to six and the sheath filaments (11) from one to seven. The cross-section of the tire cord is flattened and confined within an oval-shaped outer bound (21), the oval outer bound (21) being characterized by a major axis and a minor axis. It is desirable that the minor axis be no greater than 60% of the major axis to create the appropriate difference in the bending modulus of the tire cord in the horizontal versus the vertical direction.